

Governments through the CTEC and the HEB will co-operate with existing CAEs in the region and existing universities in Sydney and the proposed University of Western Sydney Advisory Council, to investigate the most appropriate model of a university campus development, to determine resource implications and prepare a timetable for the fulfilment of an agreed purpose.

The federal and NSW ministers will keep a close watching brief on the work of the various agencies of government and will receive jointly reports arising from their deliberations.

This meeting proposes to reassemble to receive the report on these deliberations due no later than 31 August 1986.

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Performance appraisal of university academics: issues and implications

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The current concern with declining financial resources in Australian universities has, in turn, given rise to a preoccupation with increased efficiency and effectiveness. Increasingly, the efficiency and effectiveness of university departments as a whole is being examined: individual departments in various universities have been the subject of departmental reviews. A second level at which efficiency and effectiveness may be examined is, of course, at the level of the individual academic. Most, if not all, universities in Australia have considered instituting procedures for staff development to enhance the efficiency of individual academic staff members. Some universities' efforts to institute staff development procedures are more advanced than others. Staff development is defined in one case as the 'provision of broad support required by each individual academic to strive consistently towards superior achievement in at least the main aspects of university work: teaching and research or other creative scholarly activity'.¹

While the question of staff development seems to have been posed generally in positive terms (by, for example, involving the individual academic in initiating self-assessment procedures in relation to teaching and other duties), the question of individual performance review (referred to here as performance appraisal) has caused some unease amongst academic staff. At the time of writing, FAUSA policy has moved from its earlier position of implacable opposition to performance appraisal for individual academic staff members to something of a policy hiatus. On largely pragmatic grounds, FAUSA will not at the moment oppose performance appraisal procedures provided acceptable guidelines under which performance appraisal will proceed can be established.² These guidelines have yet to be finalised.³

This paper explores issues and implications relating to the introduction of performance appraisal of individual

academic staff in universities from the viewpoint of general management theory and practice. It will be suggested that, conducted under the proper conditions, performance appraisal can be beneficial for the individual academic as well as the university. But there is also potential for the adverse use of performance appraisal procedures and the information gained from them.

Performance appraisal

Performance appraisal may be defined as a 'process by which an organisation obtains feedback about the effectiveness of its employees'. Important objectives of performance appraisal include:

- provision of adequate feedback to employees concerning their performance;
- providing a basis for modifying or changing behaviour toward more effective working habits;
- providing managers with data which may be used to judge future job assignments.⁴

Performance appraisals are used most widely as a basis for making compensation decisions. Within Australian universities, because academic staff are paid under a centrally-determined uniform pay scale, the opportunity does not exist to provide merit pay increases to individuals on the basis of performance outcomes. The end use of performance appraisal in Australian universities therefore has to be other than determining salary increases.

Other applications of performance appraisal findings include human resources planning, employee counselling, staff training and development, and selection.

One might argue that performance appraisal outcomes might be used for pay-related decisions such as promotions and accelerated incremental increases within a salary scale. But the occasions on which one can seriously contend for a promotion or an accelerated incremental increase are comparatively few. In any case, it will be argued here that performance appraisal techniques should be open and

constructive, unconstrained by "special" merit considerations (such as tenure, study leave, promotion) or punitive considerations (such as deferral or denial of tenure or dismissal). Where the performance appraisal procedures can involve some sort of benefit/penalty such as those just mentioned, the process will be less objective, more threatening and will disincline individual staff members from constructive self-criticism of their performance. Because of the limitations placed on managerial freedom by tenure and the nature of the national pay scale, in my view performance appraisal for tenured academics will have to rely for its results on persuasion toward better performance. The "special" considerations (in the sense that they arise only infrequently) just mentioned should be formally divorced from the on-going performance appraisal procedures. Decision on these "special" issues should be the subject of separate enquiry.

Consideration of the performance appraisal process might best be done by considering the following matters:

- Appraisal of what?
- Appraisal by whom?
- Frequency of appraisal
- Communication of appraisal results
- Major problems
- Designing an appraisal system
- Choosing an appraisal method

These matters will be considered in turn.

Appraisal of what?

Appraisal of an academic's performance is concerned with evaluating behaviour or results. But just what behaviour or results to focus on can be problematical. The appraisal system should have been designed to achieve an identified purpose and should help to identify what aspects of performance to measure. The items which can be measured fall into three categories. These are:

- (i) individual task outcomes (e.g. number of work items completed, tests done, papers written, etc.);
- (ii) individual behaviour (e.g. particular actions taken in discharging one's workload);
- (iii) individual traits (e.g. intelligence, attitudes, initiative, expectations, skills, etc.).⁵

It must be recognised that some task outcomes will be beyond the control of an individual academic. For example, a research project might depend on team collaboration, a teaching programme might depend for its success on the co-operation of staff in another university department, or on the availability of funding and other resources from year-to-

year. Assessment of an individual's performance on the basis of these task outcomes would be fraught with difficulty.

On the other hand, the evidence seems to suggest that possession of individual traits is of doubtful relevance in assessing an individual's performance. Mere possession of a given trait does not mean that it will be applied effectively on the job.

As a matter of practice, therefore, appraisals of individuals are best directed to assessing individual behaviour contributing to job performance and job achievement.

A performance appraisal scheme thus has to identify relevant criteria on which an academic is to be appraised. The starting point for this exercise will be some form of job analysis in which a job description — a statement of the essential duties of the job in which an appraisal is to be made — is prepared. The job description will identify the aspects of a job (or criteria) to be evaluated. In selecting the criteria, three basic considerations arise. Criteria must be:

- relevant insofar as they relate to the objectives of the job;
- free from contamination, e.g., where the same criteria apply to more than one lecturing job, the conditions and facilities available to each lecturer should not vary qualitatively to any significant extent;
- reliable insofar as a particular criterion must be stable and consistent for repeated use over time.⁶

Once the criteria have been identified, they can be translated into performance standards. Performance standards indicate the level of performance needed to be attained for the job to be well done. Good ratings are a by-product of doing the job well. Where possible, performance standards will be set in quantifiable terms. Academic staff might well be more commonly assessed on qualitative standards because teaching, research and administrative duties do not typically lend themselves to quantitative measurement.

It is not possible to suggest detailed criteria and performance standards here. Academic jobs vary sufficiently across (and perhaps within) different schools and faculties to require specific criteria and performance standards to be developed for groups of like jobs. Considerable preparatory work would have to be done within universities to determine appropriate criteria and standards as part of the development of performance appraisal systems. Selection of criteria will be problematical. But an appraisal system not specially designed for an academic environment — or particular areas of academic work — is not likely to be effective

and might well alienate academic staff.

Appraisal by whom?

Performance appraisal may generally be undertaken by one or more of the following:

- supervisors
- peers
- employee to be appraised (self-appraisal)
- subordinates of the employee to be appraised
- people outside the immediate organization, e.g., students, clients, etc.

Which of these sources of appraisal is most appropriate depends on (i) the purpose of the appraisal, (ii) the criteria being used, and (iii) the type of employee being appraised.⁶

To be qualified to evaluate others, the appraiser should meet certain requirements. These are:

- opportunity to observe: the appraiser must be in a position to collect all relevant information about the person being appraised. This could involve personal observation, access to records, and access to others who have a direct knowledge of the appraisee;
- understanding of job requirements and standards of satisfactory performance;
- having an appropriate point of view, i.e., the appraiser's own work objectives should not be in competition or at odds with the work objectives of the appraisee.⁷

Thus, where the purpose of an appraisal is to develop the employee, the aim will be to identify performance strengths which might be enhanced, and deficiencies which might be reduced or eliminated in the future. The objectives of the appraisal are more likely to be met if a positive atmosphere is developed. This might best be achieved through two-way discussions of the appraiser's judgements and self-appraisal by the academic.

Where an academic has specialised skills not shared by his/her supervisor, the supervisor will not be qualified to do the appraising. This could arise where a dean or head of department does not possess the subject expertise to appraise specialist research work in a field outside his/her own specialisation, e.g. a dean of a science faculty who is a specialist in biology might otherwise be called on to appraise critically the research efforts of a nuclear physicist. In such a case, it might be more appropriate to rely on peer appraisal and self-appraisal. These two forms of appraisal have been found to be most effective under conditions of high interpersonal trust when the appraisal is directed towards staff development con-

cerns (rather than, say, more competitive matters such as promotion, allocation of research funds, and so on).

In some cases, neither the supervisor nor peers are qualified to do the appraisal. This situation could arise in assessing a lecturer's teaching effectiveness (for the reason that a lecturer usually lectures without a supervisor or peers being present). In the absence of other arrangements (such as having colleagues sit in on one's lectures) reliance may be placed on the views of persons not employed by the university — the students. (The difficulties of assessing teaching performance are well known.⁸ Students might well form judgements on irrelevant criteria.)

Thus, while the supervisor (e.g., dean or head of department) is likely to be the appraiser, in some cases he/she will not be sufficiently well-qualified to do so. But in any case, for staff development purposes, self-appraisal can contribute constructively to the appraisal process.

Frequency of appraisal

Performance appraisals are usually formally undertaken at set intervals of six months or, more commonly, a year and are usually initiated by the supervisor. Alternative approaches could include appraising the employee at logical times during the year, such as when particular tasks or projects are completed; or having the employee initiate an appraisal in order to obtain timely feedback on his/her performance.

When appraisal is conducted on a once-a-year basis it is likely to acquire a "one-off" status such that little thought might be given to performance all year round, either by the appraiser or employee. Appraisals after long time intervals are also more likely to be prone to appraisal errors such as the "recency" effect (discussed below).

It has been observed that where the major objective of a formal appraisal interview is to motivate the employee to improve his/her performance, reliance on the traditional appraisal interview is not effective.⁹ Rather, it is suggested that appraisers 'should give specific and frequent feedback in a considerate manner throughout the year, not just once in a formal performance review session'.¹⁰

The question of the frequency of appraisal is important in appraising academics. It is suggested here that academic work is task rather than process oriented and that direct day-to-day involvement of the dean or head of department in any individual's work would be unusual. Direct supervision (and the opportunity for assessment) would, in the main, only occur intermittently. In these circumstances, feedback to the individual would be infrequent — a factor

which should be taken into account when designing the performance appraisal system.

Communication of appraisal results

The communication of the outcome of an appraisal usually occurs by means of an interview between the appraiser and the appraisee. The appraisal interview provides the appraiser with an opportunity to discuss the employee's performance and areas for possible improvement. The opportunity thus arises (but is not always taken) for providing feedback on performance to the employee. Without feedback employees might not be expected to improve their performance. Where the appraisal process is directed to staff development purposes, in particular, the provision of appropriate feedback is critical.

Appraisals to be used for staff development should emphasise better performance in the future. Because this process obviously involves identifying inadequate aspects of performance in relation to which future performance might be improved, some negative remarks might well have to be made. Considerable skill is needed by the supervisor in identifying and communicating inadequate (or negative) aspects of behaviour without deflating the appraisee. Many appraisers find the task of providing negative feedback irksome and do not provide sufficient detail. Some appraisers adopt a "sandwich" technique of providing a positive statement before delivering a negative one. But this approach leads the employee to expect further negative feedback and less weight is placed on the positive statements. Continued negative remarks will induce defensive tendencies in the employee.¹¹

To direct the appraisal discussion to the future rather than the past, the appraiser should:

- emphasise strengths on which the employee can build rather than to stress weaknesses to be overcome;
- avoid suggesting ways of changing traits but suggest more acceptable ways of behaving — feedback on behaviour should be as explicit as possible;
- concentrate on opportunities for development of the employee within his/her present position;
- limit plans for improvement to a few important items which can be accomplished within a reasonable period of time.¹²

The effectiveness of the appraisal interview has been found to be influenced more by the perceived fairness of the appraisal process itself than by the appraisal rating received. Indeed, the perceived

fairness and accuracy of the review process appear to be every bit as important as the method chosen to communicate the performance appraisal results. Favourable employee reactions to the performance appraisal process are more likely where there is:

- (i) provision of an opportunity to state their own side in the performance appraisal;
- (ii) perception that job criteria used to assess performance are relevant;
- (iii) opportunity to discuss objectives and plans during the appraisal interview; and
- (iv) perception that the appraiser has referent and expert power (where 'referent' power is influence over the appraisee because he/she perceives the appraiser as a respected colleague; and 'expert' power is influence over the appraisee because the appraiser is perceived to have expert knowledge about performance).¹³

These considerations seem particularly pertinent to a university environment. Academic staff are usually given considerable freedom in discharging their duties. In addition, their training develops in them a disposition to independence of thought. And all of this occurs in an environment in which decision-making processes are more likely to be democratic rather than autocratic (witness the large number of committees utilised in decision-making in universities). It follows that within a performance appraisal process academic staff, more than others, will wish to ensure that the procedures are fair and relevant and that the appraiser is a fit person to be assessing them.

Major problems

Performance appraisal programmes can encounter problems for various reasons. Some potential problems are:

- attempting to use the information gained from the appraisal process for a number of different reasons, many of which may be in conflict, e.g., appraisal schemes might be used to assess present performance, potential for promotion, the need for training, or staff development — all of which can call for different types of information not necessarily provided by the appraisal process in practice;
- lack of top management support;
- isolation of the performance appraisal process from the organization's corporate plan (if it has one) and from the management information system. This can occur particularly if the appraisal system is seen as the creature of, and emanating from, the personnel department;
- lack of job-relatedness. The appraisal

process is often directed to measuring personality traits and calls on a range of inadequately-trained appraisers to make valid assessments of the results;

- rater bias (some forms of which are discussed briefly below);
- failure to keep in mind that appraisal schemes which involve numerical ratings still only reflect subjective judgements. Further, across an organization, these subjective judgements will be made by different appraisers operating in different settings. Additionally, in judging staff, written reports can take on an authority for which they were not designed — the written report is unlikely to contain all of the information needed for various uses. Invalid information (invalid insofar as it is incomplete) can lead to invalid conclusions.
- too many appraisal forms can sap the enthusiasm of the appraiser for maintaining care in using the performance appraisal system — the appraiser will feel that little or no benefit will be derived from the time and energy spent on the appraisal process;
- appraisers dislike the face-to-face confrontation. In particular, if the content of appraisal reports is to be made available to appraisees, appraisers may be reluctant to put on paper frank views about employees;
- most appraisers are not sufficiently skilled in conducting appraisal interviews;
- the judgemental process can in some ways conflict with efforts to help with developing appraisees.¹⁴

In respect of these considerations, universities are likely to be no different from business organisations.

The two fundamental requirements of a performance appraisal system are that it be reliable and valid.

Reliability requires that the appraisal method used be both consistent and stable. That is, two alternative ways of gathering the same information should yield substantially the same results (consistency); and that the same measuring method be capable of giving the same results when used over time where the characteristic being measured has not changed (stability).

Consistency and stability can be adversely affected by (i) the timing of the assessment, e.g., if appraisal is done during the completion of a project when results are uncertain, rather than at its end; (ii) the characteristics of the appraiser at the time the appraisal is done, e.g., mood, illness, tiredness, etc.; (iii) changes in the characteristics of the appraisee e.g., mood, illness, tiredness, etc.; (iv) inadequate definition of what constitutes satisfactory job performance,

e.g., there might be disagreement among appraisers as to what the major dimensions of the job are.¹⁵

While the reliability of appraisal information is ultimately concerned with the relevance of the information, validity is concerned with the quality of relevant data, i.e., that it actually measures what it is intended to measure. Three techniques available for determining the quality of data are: (i) content validity (in which the performance appraisal measure and its use must derive logically from performance dimensions being tested); (ii) empirical validity (which requires that the performance measure used relates to other measures of important job outcomes); and (iii) construct validity (which combines the deductive and inductive processes of content and empirical validity respectively to ensure that the performance appraisal techniques being used conform to a model of behaviour and performance).¹⁶

Specific errors might be committed by the appraiser during the performance appraisal process. These errors, which could arise within a university management system as much as any other work organisation, include:

- halo effect where the overall judgement on an employee is influenced by one particular characteristic rather than a range of characteristics;
- error of central tendency wherein the appraiser tends to rate all appraisees towards the middle ranges of a rating scale;
- constant error which reflects the fact that different appraisers appraising the same characteristic of the one employee will give different ratings on a given rating scale, i.e., one appraiser might be "a hard marker", another a "lenient marker";
- recency error which arises through the appraiser being more influenced by the appraisee's job behaviour towards the end of the appraisal period under review, rather than taking into account job behaviour over the whole of the review period;
- contrast error whereby the appraisal of an individual is influenced by the quality of other appraisees rather than only on the merits of his or her performance;
- stereotyping — attributing the characteristics of a particular group of people to an appraisee without considering his or her individual characteristics;
- giving greater weight to negative information about performance than positive information.

Means of overcoming these errors rely on making the appraiser aware of their potential to arise, which, in turn, high-

lights the need for training for appraisers in the features of the performance appraisal system in use and the skills needed to make it effective.

The commitment of resources by universities to training staff in the procedures and spirit of a performance appraisal system is most important. But, equally important, is the willingness of senior university managers to lend weight over time to performance appraisal processes to ensure that they are taken seriously. If strong policy backing for performance appraisal is available, then the application of performance appraisal procedures is likely to be taken more seriously at all levels.

Designing an appraisal system

The most effective performance appraisal systems seem to be those which are integrated with other management procedures. Performance appraisal should constitute part of the day-to-day tasks of a manager and not be viewed as an occasional process which is divorced from overall management responsibilities.

Industry studies have shown that:

- performance tends to improve when specific job objectives are established;
- mutual goal setting by superior and subordinate is likely to provide positive results;
- performance coaching is best done on a regular basis and in direct association with specific acts, not once-a-year in an appraisal interview;
- effective performance assessment systems provide for initial skills-based training for all appraisers.¹⁷

The performance appraisal system itself should be kept relevant as the organization changes. If the goals and priorities of the organization are changing, the performance appraisal system will become meaningless unless the changes in performance expectations are made clear to the employees and the appraisal procedures changed accordingly.¹⁸

Designing performance appraisal systems will require universities to undertake considerable preparatory work. Questions which will have to be examined in designing such systems (and resolved before implementing them), will concern: establishing relevant criteria and performance standards, the frequency of appraisals, who is to do the appraising, and the performance appraisal method(s) best able to achieve staff development goals. The answers to these questions will influence the acceptability of a performance appraisal system to academic staff.

Choosing an appraisal method

No one performance appraisal method will be suitable in all circumstances. The appraisal method chosen should suit the

purpose for which the appraisals are to be used and suit also the particular characteristics of the work organization itself. The appraisal method should thus take into account:

- organizational and environmental properties such as the design of the organization, technology in use, etc;
- individual characteristics influencing performance, including specific skills, abilities and motivation levels;
- the mix of specific work behaviours, given organizational and individual considerations;
- the mix of relevant performance dimensions;
- the specific set of goals to be achieved at departmental and organizational levels.¹⁹

The most frequently employed appraisal methods fall into four categories: (i) rating scale methods, (ii) ranking methods, (iii) behaviourally-based methods, and (iv) job outcomes. In general it can be said that the easiest and least expensive methods are also the least accurate. The more sophisticated and more time-consuming methods offer more useful information. An important cost-benefit decision thus has to be made when the appraisal method is being chosen.

Rating scale methods can involve global ratings in which a single rating of overall job performance is given. This method does little to identify strengths and weaknesses in particular job dimensions and is of little value, for staff development purposes, in providing feedback to an academic. More involved rating scale methods can be devised whereby performance on selected job dimensions is measured on a separate scale. This approach does allow for greater specificity in feedback but, again, is not necessarily of use for developing academics' job performance.

Ranking methods are designed to list employees in merit order. This approach suffers from the fact that it is uni-dimensional in nature and is of little value for staff development purposes in universities.

Behaviourally-based methods focus on detailed assessment of specific acts or behaviour, rather than on global aspects of performance. This can involve identification and discussion of critical incidents in an academic's job performance. A sophisticated type of behavioural appraisal is offered by the behaviourally anchored rating scales (BARS). Under this approach a series of five or ten job dimensions are selected and performance on those dimensions is anchored by a critical incident (of either outstanding or poor performance). The critical incidents on each scale are allocated points for rating purposes. BARS are developed by com-

mittees of appraisers and appraisees and are very time consuming and costly to develop. Because of this, they are more appropriate for use with job groups which involve a considerable homogeneity of content, e.g., police officers. It is suggested here that academic jobs vary in nature sufficiently to make BARS inappropriate for use in university appraisal systems.

The most promising method of measuring outcomes of academic jobs is the management of objectives (MBO) method. MBO seeks to assess performance of appraisees on the basis of their success in achieving objectives previously determined with their supervisors. The emphasis is thus on goal achievement rather than ways in which the job was performed or the personal traits of the appraiser. A key aspect of MBO is self-appraisal by the employee and discussion of this self-appraisal along with the appraisal made by the supervisor. It is an approach which can be useful for determining areas in which future staff performance could be improved.

One further appraisal method not embraced by the four categories just considered is the essay method. This involves the appraiser in composing a statement about the individual being appraised. It does provide the opportunity to identify unique characteristics of an individual but is unlikely to be sufficiently comprehensive and consistent in content to assist in the development of an individual academic's performance over a series of appraisals.²⁰

The preparatory work that must be undertaken in designing a performance appraisal system and selecting an appraisal method or methods obviously must begin with establishing the goals the system is to achieve. Choice of an appraisal method will also be influenced by the organisational and job-related factors stated earlier. It might well be that different appraisal methods would be employed in different areas of a university because of differences in functions.

Comments and summary

It does seem that certain points need to be borne in mind if a performance appraisal system is to be effective. First, the appraisal system must be an integral part of an organization's corporate plan (or management philosophy): it should not be viewed as a discreet exercise unrelated to on-going management tasks. Second, the purpose of the appraisal system must be clear and specific: too broad a purpose will result in invalid use of the information gained. Third, those using the information drawn from appraisals must

remember that, regardless of how the appraisal is done, the whole process nonetheless is a subjective, judgemental one. The aim is to systematise the appraisals in some fashion to make them reliable and valid, not to obscure the judgemental nature of the process. Fourth, the commitment of the organization to the performance appraisal process should be such as to provide the necessary financial and other resources for its development and continued use. Of particular importance is the commitment to train appraisers and other employees in the nature and purpose of the appraisal system. Training of this type is vital in developing proper understanding of, and attitudes to, appraisal, particularly for appraisers who, at the outset, might not accept the need for an appraisal system and might not have the skills to operate it effectively.

Those using the appraisal system should recognise that the success of a work unit can depend on a range of matters (e.g., adequate strategic planning at senior levels, adequate human and other resources, and environmental factors). Staff performance is only one element in organizational efficiency and effectiveness and the performance appraisal system cannot rectify inadequacies beyond the control of employees. On the other hand, if the results of the appraisals of individual performance do not find some use in decisions about employees' work, the appraisal process will quickly lose credibility with both appraisers and employees.

Most academic jobs would seem to be only generally structured in terms of specific work criteria being available. This is presumably welcomed by academic staff who then enjoy some freedom as to how the elements of particular jobs are undertaken. It would seem to be possible to establish some job criteria on which to base performance appraisal while retaining much of that freedom. The job criteria could embrace matters which accord with existing work tasks, e.g. development of teaching courses, particular research goals, etc. Self appraisal could form part of the judgemental and development process.

There may, in practice, be little choice as to who should do the appraisals. Most university academic departments probably have a flat organisational structure with only a limited senior academic hierarchy. It is likely that the appraiser's role will be filled by the dean or head of department, although in some cases peer appraisal and, perhaps, client appraisal might be needed.

It is suggested here that performance appraisal should not form part of promotion or tenure decision-making or punitive decision-making. These decision-making processes should have their own review

systems. Failure to retain this separation will threaten the objectivity of the performance appraisal process and, in particular, the willingness of appraisees to contribute to it through self-appraisals.

The developmental benefits arising from a performance appraisal system would therefore largely have to be achieved by persuasion and not threat. If one accepts that academic staff on the whole are diligent employees who have uncommon potential to determine their own levels of work satisfaction, then the reliance on persuasion need not be a deterrent to the beneficial use of a performance appraisal system incorporating the points discussed here. Benefits can arise for both academic staff and universities.

Of greater moment will be the extent to which the purpose of the appraisal system is understood and the spirit in which it is conducted. It would seem that the introduction of performance appraisal systems to universities in Australia will call for a change in attitudes by both senior administrators and academic staff. Explanation of the purpose of the systems can be given in training programmes. Inculcation of the proper spirit will rely on the formation of attitudes at the highest levels in the universities and the communication of them to both appraisers and appraisees. Establishing a suitable environment for the successful introduction and acceptance of performance appraisals into universities will call for the commitment

of resources in terms of money and time. Unless this commitment can be made, performance appraisal is unlikely to

achieve its purpose and might well alienate staff rather than improve their efficiency and effectiveness.

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Education in the computer industry

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The rapid growth of the information industry in the past thirty years has been reflected in an ever-rising demand for the teaching of computer-related skills at all levels of the educational system. Despite the general recession which has affected the world economy since 1970, information technology has continued to expand. As a result, there appears to be a chronic shortage of appropriately trained people, particularly at the higher levels of skill and education.¹ This shortage is particularly clear in Australia, and in this paper we report the results of our inquiries, which were undertaken as part of a larger project on the changing nature of work in the electronic data processing industry.

Supply and demand in the computer specialist workforce

Peter Senker, a long-time student of industrial training in Britain, notes the conflict between the short-term demands of industry and the need for governments to pursue long-term strategic goals.² The Japanese, he argues, have succeeded partly because of their willingness to make long-term investments in scientific education and training. An educated work force is itself an important spur to technological advances, which in their turn increase the demand for skills. Senker notes that in the difficult economic situation of the 1970s, the Japanese unemployment rate did not rise despite the continuing drive towards automation. He argues that the same logic can be applied in other countries, and

criticizes simplistic labour market analysis which seeks to equate supply and demand, on the assumption that the demand for labour can be extrapolated from current market trends. What should be emphasized is that a highly skilled, innovative and flexible workforce is primary for a labour-intensive industry, where the greatest demand is for highly skilled workers.

It is relevant to notice that innovation in the computer industry has been spatially concentrated and linked with the immediate availability of university personnel, both as researchers and as employees. The examples of Route 128 and Silicon Valley in the USA are well known, and the British government has encouraged a similar development in Silicon Glen between Edinburgh and Glasgow. A recent